Self-Expanding Metallic Ureteral Stents for Treatment of Ureteral Stenosis After Kidney Transplantation


ABSTRACT

The incidence of post–renal transplantation ureteral stenosis ranges from 2%–12%. Because the role of self-expanding ureteral metallic stents for its treatment has been scarcely reported, the aim of this study was to evaluate the efficacy of Nitinol stents. Eleven ureteral stenoses in patients with chronic graft dysfunction (8 cases) or high surgical risk (3 cases) were treated by antegrade percutaneous implantation of Nitinol stents through a nephrostomy tract. The mean follow-up period was 48 ± 7 months (range, 3–85 months). The patency rate at the moment of return to dialysis, death, or last check-up was 73% (8/11). Three patients (27%) developed stent occlusion. Two patients were treated using a trans-stent double-J catheter and 1 patient using stent removal and pyeloureterostomy using the native ureter. The mean percentage decrease in serum creatinine (Cr) level after stent implantation was 41% (range, 14%–63%). Nitinol ureteral stent implantation is an effective alternative for the treatment of ureteral stenosis in patients with chronic graft dysfunction or high surgical risk.

URETERAL obstruction occurs in 1%–10% of all kidney transplant cases. In 75% of instances, the stricture is located at the level of the distal ureter, either secondary to ischemia or to a faulty surgical technique.

Classically, surgical correction with ureteroneocystostomy or pyeloureterostomy using the native ureter has been the treatment of choice. However, advances in interventional radiology and endourological techniques now allow percutaneous treatment of ureteral stenosis. Balloon dilation followed by placement of a double J catheter for 4–8 weeks has been reported to be successful in 38%–80% of the patients at 1 year.

Metallic self-expanding stents have been used to manage malignant and benign ureteral obstructions in native kidneys. However their use for treatment of transplant ureteral stenosis has been scarcely reported.

METHODS

Among 355 transplantations performed between October 1995 and December 2003, 11 patients with ureteral stenoses were treated using implantation of a self-expanding Nitinol ureteral stent (Angiomed-Movaco, Karlsruhe, Germany). Only patients with chronic graft dysfunction (serum creatinine [Cr] level >2.5 mg/dL; n = 8) or high surgical risk (n = 3) were considered candidates for a metallic ureteral stent.

The length of stenoses varied from 1–3.5 cm. The stent was always implanted antegrad through a previous nephrostomy tract, after passing a guidewire across the stricture and performing balloon-catheter dilation. The stent diameter was 8 mm and the length ranged from 1–4 cm. Antegrade pyelography confirmed ureteral patency after stent implantation.

Cr, urine culture, and graft ultrasound were examined at 3-month intervals. Success criteria were patency of the stent at moment of death, return to dialysis, or last clinical review.

RESULTS

After a mean follow-up of 48 months (3–85 months), 8 of 11 (73%) stents were patent. Three (27%) were obstructed at 2, 3, and 4 months postimplantation, respectively. In 2 of them, the obstruction was resolved by a trans-stent double J ureteral insertion until death or return to dialysis. In the third case a pyeloureterostomy with the recipient native ureter was performed after stent removal.

The mean Cr decrease was 41% (range, 14%–63%). Two (18%) of the 11 patients experiment a urinary tract infec-
tion (E. coli and P. aeruginosa) as urine culture findings without clinical symptoms.

DISCUSSION

The complication of ureteral obstruction is observed in 1%-10% of transplant recipients. The treatment of choice is surgical repair with a new ureteroneocystostomy or ureteropyeloureterostomy with the native ureter. However, some patients show high surgical risk or severe chronic graft dysfunction and, therefore, are not considered for a surgical approach. Endourological treatment using a double J catheter insertion or balloon dilation followed by stent placement has been reported with success rates ranging from 38%-80%.

Additionally, sometimes double J stents have been reported with success rates ranging from 38%-80%. Additionally, sometimes double J placement has been reported with success rates ranging from 38%-80%. Additionally, sometimes double J placement has been reported with success rates ranging from 38%-80%. Additionally, sometimes double J placement has been reported with success rates ranging from 38%-80%. Additionally, sometimes double J placement has been reported with success rates ranging from 38%-80%. Additionally, sometimes double J placement has been reported with success rates ranging from 38%-80%. Additionally, sometimes double J placement has been reported with success rates ranging from 38%-80%

Furthermore, sometimes double J stents have failed to resolve obstruction associated with ureteral stenosis or cause bladder-irritating symptoms. A permanent nephrostomy tube until the return to dialysis is another alternative that occasionally is associated with infection or catheter displacement. Extra-anatomical diversion by a subcutaneously placed tunnelled stent has been described.

Self-expanding metallic stents are widely used in the management of cardiovascular, biliary, and gastroenterological diseases. Their use in malignant ureteral stenosis has been reported to show a patency rate of 64% at 6 months and 31% at 12 months. However, the use of metallic stents for treatment of benign strictures has scarcely been reported. The patency rate in this circumstance has been around 70% with a mean follow-up of 18 months.

To the best of our knowledge, there are few publications describing treatment of posttransplantation ureteral stenoses with metallic stents. After balloon dilation, Herrero et al described 2 cases using a Wallstent insertion, 40-mm long and 6 mm in diameter. They observed no cases of obstruction, infection, or incrustation; however, the follow-up period was not specified. Peregrin and Lacha reported 1 case of a 10-mm long distal ureteral stenosis treated with a Gianturco-Rosch double segment 8-mm diameter biliary metallic stent. After almost 3 years of follow-up, the stent was patent. Kulkarni and Bellamy reported 1 case of ureteral stent treatment using a Memokath metallic stent of 10-Fr diameter.

In our study, the use of Nitinol (alloy of nickel and titanium) stents to treat ureteral stenosis was effective in 73% of cases with a mean follow-up of 48 months. Obstruction of the stent due to urothelial hyperplasia occurred in 27% of patients. This obstruction usually appeared early after stent implantation, namely, between 2 and 4 months. The implantation was always performed using an antegrade approach through a nephrostomy tract after passing a Terumo guidewire across the stenosis and dilating it with a balloon catheter. In distal ureteral stenoses, it is mandatory to perform the implantation under bladder endoscopic control to avoid stent protrusion below the ureteral orifice, because this situation theoretically increases the risk of encrustation.

The metallic ureteral stent should not be considered the first option for treatment of ureteral obstruction. Only kidney transplant recipients with severe chronic graft dysfunction or high surgical risk should be treated using this technique, because long-term patency is not clearly established.

In conclusion, Nitinol ureteral stent implantation was an effective technique for treatment of ureteral strictures in patients with chronic graft dysfunction (Cr >2.5 mg/dL) or high surgical risk.

REFERENCES